

What we claim is:

1. A molecule represented by any one of the formulas I-IV:

- I. $[(L)_t-(N)_r-(H)_q-(P)_s]_x$
- II. $[(L)_t-(H)_q-(N)_r-(P)_s]_x$
- III. $[(P)_s-(N)_r-(H)_q-(L)_t]_x$
- IV. $[(P)_s-(H)_q-(N)_r-(L)_t]_x$

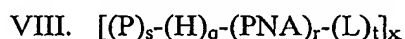
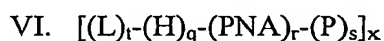
wherein

N is a nucleic acid sequence targeting iNOS, L is a peptide ligand which binds to a specific receptor, P is a positively charge moiety; and H is an hydrophobic moiety wherein r is an integer of 1-25, t is an integer of 1-25, s is an integer of 1-25, q is an integer of 0-20, and x is an integer of 1-20.

2. The molecule according to claim 1, wherein said nucleic acid sequence is a mRNA, a cDNA, a DNA, a DNA analog, a polyamide nucleic acid (PNA), a PNA morpholino, an aminoethylprolyl (aep) PNA, a pyrrolidinyl PNA, an oligonucleotide, an oligonucleotide analog, a ribozyme or an RNAi.
3. The molecule according to claim 1, wherein said nucleic acid sequence is a PNA targeting iNOS, wherein said PNA is DNA, cDNA, RNA or mRNA.
4. The molecule according to claim 1, wherein said nucleic acid sequence is an antisense, an antigene or a decoy function targeting iNOS DNA, cDNA, RNA or mRNA.
5. The molecule according to claim 1, wherein said nucleic acid sequence is neutral or negatively charged.
6. The molecule according to claim 1, wherein said peptide ligand binds a receptor to transferrin, insulin, insulin growth factor, Insulin growth factor or leptin.
7. The molecule according to claim 6, wherein said insulin growth factor is insulin growth factor-I or insulin growth factor-II.
8. The molecule according to claim 1, wherein said peptide ligand has amino acid sequence, which is HAIYPRH or THRPPMWSPVWP.

9. The molecule according to claim 1, wherein said hydrophobic moiety is a nucleic acid.
10. The molecule according to claim 1, wherein said hydrophobic moiety is a hydrophobic peptide, lipid acid, lipid molecules, octanol, cholesterol,
5 hydrophobic peptide protecting group, adamantine, pyrene, eicosenoic acid, C₍₆₋₁₆₎ glyceride lipid, phenoxazine, DMT group, cholenic acid, lithocholic acid, myristic acid, palmitic acid, heptadecyl group, hexadecylglycerol, geranyloxyhexyl group, hexadecylamine, dihydrotestosterone, 1-pyrene butyric acid, alkanoic acid, alkanol or any derivatives thereof.
- 10 11. The molecule according to claim 10, wherein said alkanoic acid is represented by the structure $R-(CH_2)_n-COOH$, wherein $n = 1-20$ and R is a linear or branched alkyl.
12. The molecule according to claim 10, wherein said alkanol is represented by the structure $R-(CH_2)_n-OH$, wherein $n = 1-20$ and R is a linear or branched
15 alkyl.
13. The molecule according to claim 10, wherein said lipid acid is undecanoic acid and/or docosahexanenonic acid.
14. The molecule according to claim 10, wherein said hydrophobic peptide protecting group is Fmoc or Tmoc.
- 20 15. The molecule according to claim 1, wherein said positively charge moiety is a nucleic acid.
16. The molecule according to claim 1, wherein said positively charge moiety is positively charge peptide, peptidomimetic, polycations, histidine, imidazole group, 2-O-aminopropyl, 2-O-dimethylaminopropyl, 2-O-imidazolyl-ethyl,
25 2-O-aminoethylamino-oxyethyl, 2-dimethylaminoethyl-oxyethyl or any derivative thereof.
17. The molecule according to claim 1, wherein said positively charge moiety comprises at least one group of arginine, polyamine and/or guanidine.
18. The molecule according to claim 17, wherein said polyamine is spermine,
30 spermidine or putricine.

19. The molecule according to claim 1, wherein said peptide ligand, said nucleic acid sequence targeting iNOS, said hydrophobic moiety, and said positively charge moiety are linked to each other directly via peptide bonds.
20. The molecule according to claim 1, further comprising a linker moiety linking between said peptide ligand, said hydrophobic moiety, said nucleic acid sequence targeting iNOS and said positively charge moiety.
21. The molecule according to claim 20, wherein said linker moiety is polyethylene glycol, disulfide, amide, amine, oxyamine, oximine, morpholine, thioether, thiourea sulfonamide, ether, ester, carbonate, carbamate, avidin, strepavidin, biotin, praline, lysine, cysteine, guanidine or any combination thereof.
22. The molecule according to claim 21, wherein the molecular weight of said polyethylene glycol is in the range of 2000-40,000.
23. A molecule represented by any one of the formulas V-VIII:



wherein the PNA is PNA sequence targeting iNOS DNA, cDNA, RNA or mRNA and is 1-100 bases, L is a peptide ligand which binds to a specific receptor and P is a positively charge moiety; and wherein r is an integer of 1-25, t is an integer of 1-25, s is an integer of 0-25, q is an integer of 0-20 and x is an integer of 1-20.

24. The molecule according to claim 23, wherein said PNA sequence targeting iNOS DNA, cDNA, RNA or mRNA is an antisense, an antigene or a decoy function.
25. The molecule according to claim 23, wherein said PNA sequence targeting iNOS DNA, cDNA, RNA or mRNA is neutral or negatively charged.
26. The molecule according to claim 23, wherein said peptide ligand binds a receptor to transferring, insulin, insulin growth factor, Insulin growth factor or leptin.

27. The molecule according to claim 26, wherein said insulin growth factor is insulin growth factor-I or insulin growth factor-II.
28. The molecule according to claim 23, wherein said peptide ligand has amino acid sequence, which is HAIYPRH or THRPPMWSPVWP.
- 5 29. The molecule according to claim 23, wherein said hydrophobic moiety is a nucleic acid.
30. The molecule according to claim 23, wherein said hydrophobic moiety is hydrophobic peptide, lipid acid, lipid molecules, octanol, cholesterol, hydrophobic peptide protecting group, adamantane, pyrene, eicosenoic acid, 10 C₍₆₋₁₆₎ glyceride lipid, phenoxazine, DMT group, cholenic acid, lithocholic acid, myristic acid, palmitic acid, heptadecyl group, hexadecylglycerol, geranyloxyhexyl group, hexadecylamine, dihydrotestosterone, 1-pyrene butyric acid, alkanolic acid, alkanol or any derivatives thereof.
31. The molecule according to claim 30, wherein said alkanolic acid is 15 represented by the structure R-(CH₂)_n-COOH, wherein n = 1-20 and R is a linear or branched alkyl.
32. The molecule according to claim 30, wherein said alkanol is represented by the structure R-(CH₂)_n-OH, wherein n = 1-20 and R is a linear or branched alkyl.
- 20 33. The molecule according to claim 30, wherein said lipid acid is undecanoic acid and/or docosahexanenonic acid.
34. The molecule according to claim 30, wherein said hydrophobic peptide protecting group is Fmoc or TboC.
35. The molecule according to claim 23, wherein said positively charge moiety 25 is a nucleic acid targeting iNOS DNA, cDNA, RNA or mRNA.
36. The molecule according to claim 23, wherein said positively charge moiety is positively charge peptide, peptidomimetic, polycations, histidine, imidazole group, 2-O-aminopropyl, 2-O-dimethylaminopropyl, 2-O-imidazolyl-ethyl, 2-O-aminoethylamino-oxyethyl, 2-dimethylaminoethyl- 30 oxyethyl or any derivative thereof.

37. The molecule according to claim 23, wherein said positively charge moiety comprises at least one group of arginine, polyamin and/or guanidine.
38. The molecule according to claim 37, wherein said polyamine is spermine, spermidine or putricine.
- 5 39. The molecule according to claim 23, wherein said peptide ligand, said PNA sequence targeting iNOS DNA, cDNA, RNA or mRNA, said hydrophobic moiety and said positively charge moiety are linked to each other directly via peptide bonds.
- 10 40. The molecule according to claim 23, further comprising a linker moiety linking between said peptide ligand, said hydrophobic moiety, said PNA sequence and said positively charge moiety.
41. The molecule according to claim 40, wherein said linker moiety is polyethylene glycol, disulfide, amide, amine, oxyamine, oxyimine, morpholine, thioether, thiourea sulfonamide, ether, ester, carbonate, carbamate, avidin, strepavidin, biotin, praline, lysine, cysteine, guanidine or
15 any combination thereof.
42. The molecule according to claim 41, wherein the molecular weight of said polyethylene glycol is in the range of 2000-40,000.
- 20 43. A composition is comprising as an active ingredient an effective amount of one or more molecules according to claim 1, together with one or more pharmaceutically acceptable excipients or adjuvants.
44. A composition comprising as an active ingredient an effective amount of one or more molecules according to claim 23, together with one or more pharmaceutically acceptable excipients or adjuvants.
- 25 45. The composition according to claim 43, formulated for oral or parenteral administration.
46. The composition according to claim 44, formulated for oral or parenteral administration.
- 30 47. The composition according to claim 43, formulated as uncoated tablets, coated tablets, pills, capsules, powder or suspension.

48. The composition according to claim 44, formulated as uncoated tablets, coated tablets, pills, capsules, powder or suspension.
49. The composition according to claim 43, formulated for intravenous administration.
- 5 50. The composition according to claim 44, formulated for intravenous administration.
51. The composition according to claim 43, formulated for intranasal administration.
52. The composition according to claim 44, formulated for intranasal
10 administration.
53. The composition according to claim 43, formulated for administration via aerosols.
54. The composition according to claim 44, formulated for administration via aerosols.
- 15 55. The composition according to claim 43, formulated for transdermal administration.
56. The composition according to claim 44, formulated for transdermal administration.
57. The composition according to claim 43, formulated in an ointment, cream or
20 gel form.
58. The composition according to claim 44, formulated in an ointment, cream or gel form.
59. A method for the synthesis of a molecule according to claim 23.
60. A method for delivering a nucleic acid sequence targeting iNOS DNA,
25 cDNA, RNA or mRNA across a cellular membrane comprising the step of applying to a cell an effective amount of one or more molecules according to claim 1.
61. The method according to claim 60, wherein said cell is an endothelial cell.
62. The method according to claim 60, wherein said cell is a neuronal cell.
- 30 63. The method according to claim 60, wherein said cell is glial cell.

64. A method for delivering a PNA sequence targeting iNOS DNA, cDNA, RNA or mRNA across a cellular membrane comprising the step of applying to a cell an effective amount of one or more molecules according to claim 23.
- 5 65. The method according to claim 64, wherein said cell is an endothelial cell.
66. The method according to claim 64, wherein said cell is a neuronal cell.
67. The method according to claim 64, wherein said cell is glial cell.
68. The method according to claim 64, wherein said cell is oligodendrocyte cell.
- 10 69. A method for intracellular targeting of a nucleic acid sequence targeting iNOS DNA, cDNA, RNA or mRNA to an intracellular organelle comprising the step of applying to a cell an effective amount of one or more molecules according to claim 1.
70. A method for intracellular targeting of a PNA sequence targeting iNOS
15 DNA, cDNA, RNA or mRNA to an intracellular organelle comprising the step of applying to a cell an effective amount of one or more molecules according to claim 23.
71. A method for intracellular targeting of a nucleic acid sequence targeting iNOS DNA, cDNA, RNA or mRNA to an intracellular organelle comprising
20 the step of applying to a cell an effective amount of one or more molecules according to claim 1, wherein said molecule crosses the nuclear membrane.
72. A method for intracellular targeting of a PNA sequence targeting iNOS DNA, cDNA, RNA or mRNA to an intracellular organelle comprising the step of applying to a cell an effective amount of one or more molecules
25 according to claim 23, wherein said molecule crosses the nuclear membrane.
73. A method for delivering a nucleic acid sequence targeting iNOS DNA, cDNA, RNA or mRNA to the brain across the blood brain barrier, said method comprising the step of administering to a subject an effective amount of one or more molecules according to claim 1.
- 30 74. A method for delivering a PNA sequence targeting iNOS DNA, cDNA, RNA or mRNA to the brain across the blood brain barrier, said method

comprising the step of administering to a subject an effective amount of one or more molecules according to claim 23.

75. A method for delivering a nucleic acid sequence targeting iNOS DNA, cDNA, RNA or mRNA to the brain across the blood brain barrier, said method comprising the step of administering to a subject a composition according to claim 43.

76. A method for delivering a PNA sequence targeting iNOS DNA, cDNA, RNA or mRNA to the brain across the blood brain barrier, said method comprising the step of administering to a subject a composition according to claim 44.

77. A method for delivering a PNA sequence targeting iNOS DNA, cDNA, RNA or mRNA to the spinal cord, said method comprising administering to a subject an effective amount of one or more molecules according to claim 1.

78. A method for modulating iNOS gene expression, said method comprising administering to a subject an effective amount of one or more molecules according to claim 23.

79. A method for modulating iNOS gene expression, said method comprising administering to a subject one a composition according to claim 43.

80. A method for modulating iNOS gene expression, said method comprising administering to a subject one a composition according to claim 44.

81. A method for the treatment, prevention and control of a disease as a result of inhibition of iNOS translation, said method comprising administering to a subject an effective amount of one or more molecules according to claim 1.

82. The method of claim 81, wherein said disease is multiple sclerosis.